Digital age dawns for construction industry

By Dr Keith Hampson, CEO of the CRC for *Construction Innnovation*

Over the past two years, the CRC for Construction Innovation has collaborated with Australia's facilities management (FM) leaders in a project that will help bring Australia's most iconic building, the Sydney Opera House, into the digital age.

The Sydney Opera House FM Exemplar project involved investigating and highlighting FM practice, using one of Australia's most unique buildings as a model.

A component of this research – and one which attracted a good deal of interest amongst the 300 FM industry participants at workshops held in Sydney, Melbourne and Brisbane in November 2006 – was the development of a digital model of a section of the Sydney Opera House.

Because the Sydney Opera House was completed without the assistance of even basic two-dimensional digital drawings and varies from the architect's original drawings, the building never had a definitive set of plans nor integrated documentation incorporating the many service changes made over the years.

The Sydney Opera House stages some 1,500 performances a year, attended by 1.1 million patrons, with a further 1,000 non-performance related events ranging from exhibitions to corporate launches and weddings. It is one of the busiest performing arts centres in the world. As a major international tourist attraction, an estimated 4.5 million people visit Sydney Opera House each year.

Clearly there are many benefits for management to incorporate information about the facility into a consistent, single data source.

Digital modelling, through the establishment of a building information model, can be designed to support a range of information. The digital model of the Sydney Opera House offers a visual representation of the building and its component elements in 3D computer-aided design (CAD) and provides comprehensive property data for each element, and can integrate geographical information system (GIS) information. The model enables the collection of data from disparate software systems, hard copy and new model-based systems – through the use of an open data exchange standard common to all compliant software.

Such a model can incorporate huge amounts of servicing, maintenance and costing information. It includes all information about objects within a building, such as lifts, ventilation and fire systems, and the relationship between them in a single repository – ensuring consistent, accurate and up-to-date access.

It is not, therefore, surprising that the digital modelling component of the project attracted such a high level of interest in the FM industry – particularly as it was developed as part of an integrated FM solution that also incorporates service procurement and benchmarking.

But digital modelling also offers real benefits to the broader construction industry. A digital model can provide coordinated, consistent computable information about the design of a facility (infrastructure or building) that yields reliable digital representations that can be used for design and fabrication decision-making, production of high-quality construction documents, performance predictions (including safety and sustainability), cost estimating and construction planning, and, eventually, for managing and operating the facility. It allows different disciplines – the property developer, the structural engineer, the architect, the cost planner, the constructor and facility manager – to link into a single, distributed digital model.

Currently we have a situation where 25-30 per cent of the construction cost is caused by splitting up of processes and poor communication. Before a building is handed over to the owner organisation, the same information can be re-entered, on average, seven times in different systems. And the same information is re-created several times in different software.

Construction Innovation is working closely with its stakeholders and key industry players to develop an integrated digital solutions research program which aims to address some of these inefficiencies.

We can do better!